

MODULE TEN- CASE STUDY: THE NEW ATTACK SUBMARINE

LESSON ASSIGNMENT

IPPD :

Objectives:

- To

Desired Learning Outcomes: The student should be able to:

- Understand the

Assignments/References:

Chapter 10

WORKBOOK FOR MODULE TEN

THE NEW ATTACK SUBMARINE

Mr. Kevin Poitras
Electric Boat Corp.

Preparations:

This section has two stages of questions. The first stage is below, and the questions should be answered before watching the video. The second stage is comprised of questions to be answered at the conclusion of the video. The answers can be found in the back section of your workbook. Complete the questions in the space provided or on the back of the page.

STAGE ONE (Discussion)

- D1. What characteristics are important to capture in an IPPD case study?
- D2. How would you apply the lessons learned in this case study to your own work?
- D3. Is it important to understand the technical objectives of a case study to learn from their lessons? Why or Why Not?

STAGE TWO (End of Video)

- Q1. What was the key objective of the New Attack Submarine program in using IPPD as a management system?
- Q2. What are the three “key areas” of the New Attack Submarine Program?
- Q3. With reference to the New Attack Submarine program and Dr. Schrage’s module on “A Generic IPPD Method”, what was the common feature that integrated the IPPD for this program?
- Q4. According to the New Attack Submarine, how were the program’s schedule, cost, and change orders effected because of the implementation of an IPPD program?
- Q5. What was the predicament of the New Attack Submarine in the early stages of the requirement?

- Q6. Mr. Poitras alludes to one main reason why the program has been successful to date. What was it?
- Q7. How were the teams formed for the New Attack Submarine System?
- Q8. What was the improvement in modular construction by the use of IPPD?
- Q9. How did the New Attack Submarine program facilitate team communication? What was the ultimate result?
- Q10. How did the New Attack Submarine Program solve the “design-visualization” requirements of the automated system requirement?
- Q11. What was the savings, in terms of schedule time, that on-line analysis provided?
- Q12. Compare the amount of data required by the New Attack Submarine system to that of the F-22.
- Q13. How did IPPD remove the requirement for prototyping causing a substantial savings in manufactured installation of modules?
- Q14. What was a major “Lesson Learned” with respect to the vendor base on the part of the Electric Boat company and the New Attack Submarine Program?

STAGE THREE (Reflection)

- Q15. Reflect on the major culture changes that had to occur in the company and with the customer in order to pursue this program.
- Q16. Where would you rate the New Attack Submarine Program in terms of innovation or “thinking outside of the box”?
- Q17. Reflect on what generic methods were incorporated by the New Attack Submarine Program, and those that were not mentioned by Mr. Poitras.

ANSWERS TO MODULE TEN

CASE STUDY: THE NEW ATTACK SUBMARINE

- Q1. What was the key objective of the New Attack Submarine program?
- A1. The key objective was to get the design done before production started.
- Q2. List the three key areas of the New Attack Submarine program?
- A2. Process,
Tools,
Team Based Organization.
- Q3. With reference to the New Attack Submarine program and Dr. Schrage's module on "A Generic IPPD Method", what was the common feature that integrated the IPPD for this program?
- A3. According to the generic methodology presented by Dr. Schrage, and the presentation of the New Attack Submarine made by Mr. Poitras, the information integrating function was a necessity and could not have been done without a computer assisted system.
- Q4. According to the New Attack Submarine, how were the program's schedule, cost, and change orders effected because of the implementation of an IPPD program?
- A4. Sixty percent of the schedule was reduced, 20% of the cost of the boat, and an expected 65% reduction in change orders after production commences.
- Q5. What was the predicament of the New Attack Submarine in the early stages of the requirement?
- A5. The Russian new submarine had to be countered. However, countering the threat with existing systems could not be done because the way submarines were built in the past was not affordable.
- Q6. Mr. Poitras alludes to one main reason why the program has been successful to date. What was it?
- A6. According to Poitras, the program could not have reached as far as it has successfully without top-down support throughout all echelons.
- Q7. How were the teams formed for the New Attack Submarine System?
- A7. Teams were formed based on their expertise necessary for a major cylinder or mold of the submarine. Expertise necessary to cover "stem to stern" systems were

covered by an integrating team. Team members could sit on more than one team especially if the system went through other modules.

Q8. What was the improvement in modular construction by the use of IPPD?

A8. Approximately 65% of the previous model submarine was built modularity. That is 65% percent of the ship was constructed in a “shop environment”. The New Attack Submarine, through the use of IPPD, now constructs 95% of the modules in a shop environment and these are then “loaded in” the ship’s hull at the dock.

Q9. How did the New Attack Submarine program facilitate team communication? What was the ultimate result?

A9. Previous submarine construction required program design review twice a month or better. The New Attack Submarine holds face-to-face design reviews every two months with the customer. These meeting are strictly programmatic reviews (Cost schedule). Weekly video conferences for all team members evolving to video conferring “on-demand” is now the normal mode of the program meeting schedule.

Q10. How did the New Attack Submarine Program solve the “design-visualization” requirements of the automated system requirement?

A10. Recognizing that there were two distinct “viewer” requirements the program decided to use CATIA as the design tool but found that it was too complex for anyone to use without extensive training. In order to accommodate the team members that needed to review and “buy in” to processes, products and their design, a “visualization system” (IGRIP Deneb Robotics) was added to allow anyone on the team to view and make their decision based on what they saw.

Q11. What was the savings in terms of schedule time that on-line analysis provided?

A11. Prior submarine construction required design/blueprint grid analysis that would take additional time to draw on the board, perform computational analysis (e.g. stress) after hand off from the designer. The new submarine program does analytical work on line (through the IGRIP Deneb product) thereby saving a large amount of time. It had direct impact on the total schedule to production time.

Q12. Compare the amount of data required by the New Attack Submarine system to that of the F-22.

A12. The New Attack Submarine has a requirement to track 145 gigabits of information as opposed to 45 gigabit for the F-22.

Q13. How did IPPD remove the requirement for prototyping causing a substantial savings in manufactured installation of modules?

A13. Prior construction techniques required all systems to be fit in a prototype of the actual submarine so that they could be “proofed”. This required the construction of

a “prototype” submarine. Since the concept was to modularize the construction of the submarine there was no need to build the prototype and test out each component. Testing was done using the actual vehicle at the test prototype, which saved a lot of time and resources.

Q14. What was a major “lesson learned” with respect to the vendor base on the part of the Electric Boat company and the New Attack Submarine Program?

A14. One of the lessons learned with respect to the vendor base was the ability to have the vendor base on compatible data systems. Electric boat did not require their vendors to have the same database system. Compatible (but different) systems were not yet available. This resulted in the vendor data base being re-drawn into the overall program data base. In the future it will be necessary to have the vendors use “compatible” systems and data bases, then the vendor base could become a functioning team member with all purchasing data streams captured along with manufacturing data and design data as it occurs.